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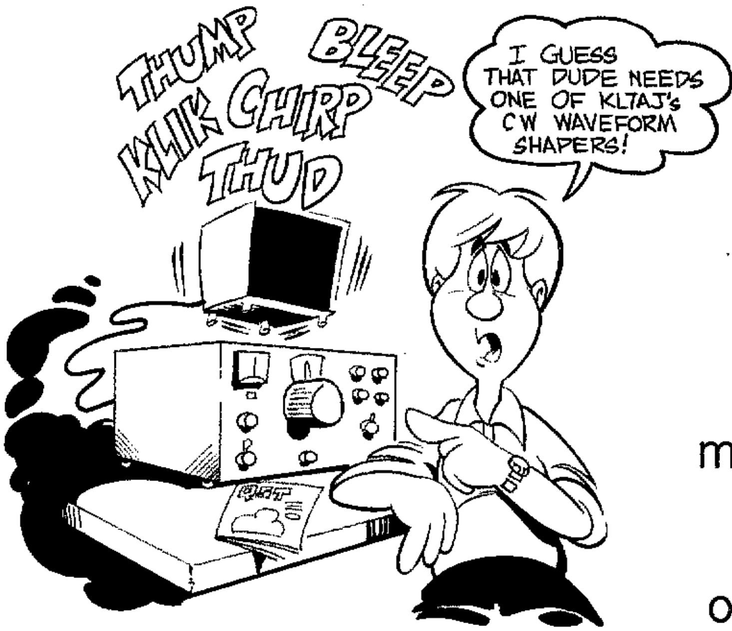

Try This Versatile CW Shaper

The CW waveform shaping of many rigs may not always meet your needs. This circuit will enable you to shape your rig's output waveform to your tastes.

By Eric P. Nichols,* KL7AJ

Are you dissatisfied with your CW signal quality? You say your new rig just doesn't "chop it"? Well, many dedicated CW operators feel a twinge of despair because they think the CW feature of many new transceivers was thrown in by the designer as an afterthought. To be sure, the state of the art has taken us to the point where drift, chirp and ac hum no longer plague us as they did with earlier CW rigs; a T9 signal is now the rule rather than the exception.

One thing that can set an excellent CW signal apart from a mediocre one is something over which we have little control in a modern rig: the wave shape. In most transmitters it is adjusted for a compromise, or so it would seem, under ideal conditions at moderate keying speeds. This is fine for the occasional CW operator, but not for a bona fide "ditty bopper." After all, the output waveform is the only voice we CW operators have!

But there is more to the wave shape than the simple matter of taste. What happens to an ideal wave shape when we pass our signals through an amplifier that is not perfectly linear in performance? More than likely the waveform will become "harder," and key clicks might occur. An even more dramatic result may occur when using a nonlinear amplifier (class C) after the exciter. Class-C amplifiers harden a well-shaped excitation signal. Unfortunately, the average rig has no provision for softening the keying to compensate for the use of class-C amplifiers.

Hard Versus Soft Keying

Let's backtrack to the matter of taste. It is well recognized that moderately hard keying (presence, if you will) is best for weak-signal work, for it is easier to copy this type of note through noise. But for local work and ragchewing, a hard signal can become tiresome to listen to, even if it is not clicky. By having a moderately hard attack characteristic and an extra long waveform tail (soft decay), one can make the rig impart a note that has a bell-like quality. I can listen for hours to a signal that is shaped in that fashion, especially when the signal is exceptionally loud. On the other hand, a soft attack and a hard decay make the note sound mushy and clicky.

A Practical Shaping Unit

I will describe a versatile wave shaper

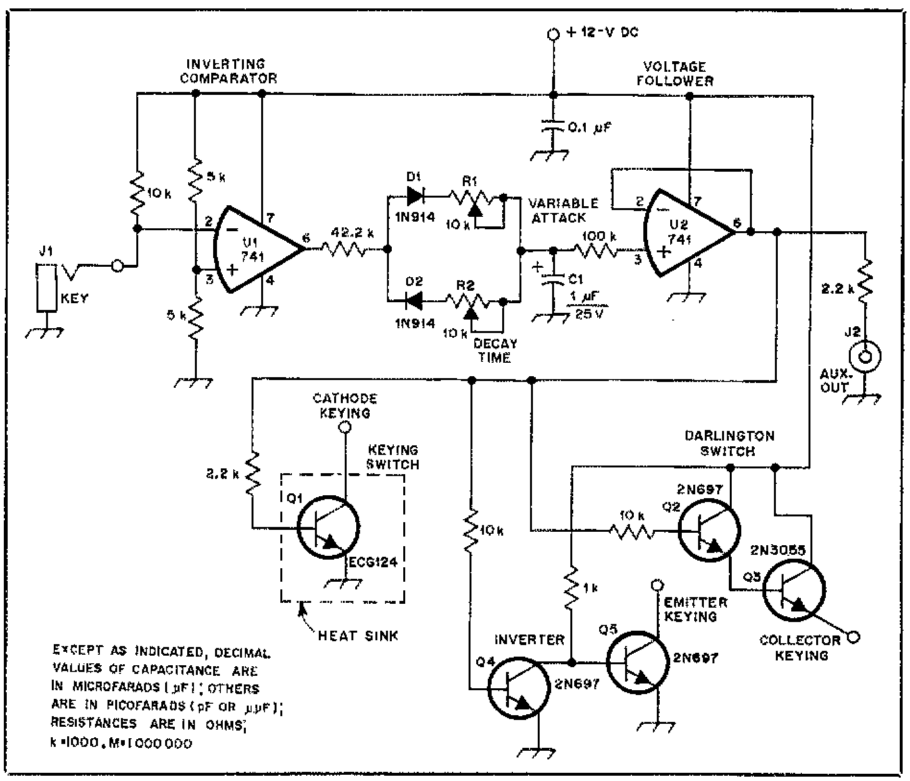

Fig. 1 — Schematic diagram of the CW shaper. Fixed-value resistors are ¼- or ½-W carbon-composition types. C1 is electrolytic or tantalum. The dashed-line box indicates a heat sink at Q1. J1 and J2 may be of the operator's choice. R1 and R2 are linear-taper controls that are panel mounted for operator convenience.

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that has independent control over the attack and decay times (Fig. 1). The continuously variable adjustments have enough range to compensate for any nonlinearities you are likely to encounter in your transmitter. There will be some latitude for your personal CW voice, too! Three outputs are provided to allow keying of different transmitter circuits.

The circuit operates as follows: U1 is an inverting comparator. It isolates the key from the ensuing circuitry and provides a +12-V source with the key down, and a solid ground when the key is up. When the key is down, the U1 output is +12 V, causing D1 to be forward biased. C1 is then charged through R1, the variable-attack control. The process reverses when the key is up, and C1 discharges through the decay-time control, R2. During this period, D1 is reverse-biased, so R1 has no effect on the decay-time constant.

U2 of Fig. 1 is a voltage follower that merely "reads" the voltage of C1 and applies it to the keying transistors. Q1 is an open collector, high-voltage transistor we can use to key the cathodes of tube-style transmitters. Q2 and Q3 comprise a Darlington pair that may be used for keying the collector supply of typical crystal-controlled portable transmitters. Q4 is an inverter that drives the open-collector transistor, Q5; a "backwards" output (emitter keying) is needed for certain SSB/CW rigs.

Considerable tracing of wiring and perusal of the schematic diagram may be necessary to learn exactly how your modern rig is keyed. But once you find the spot and method, the circuit of Fig. 1 should do the trick. If you need an output device not included in this shaper, you may drive it from J2, labeled AUX OUT. Keep in mind that the device must be an *analog* unit. A switching transistor, for example, would negate the effectiveness of the shaper.

Construction

The layout of this circuit is not critical. But, it is wise to keep the leads short and direct. Perforated board can be used as a foundation, or you may choose to lay out a PC board for the unit. A grounded metal cabinet is recommended to help keep unwanted RF energy from entering the unit. Ferrite beads can be used at the input and output terminals (inside the box) to aid RF isolation.

Once you have effectively interfaced your shaper with that rig, your CW operating will never be dull. Keep your signal in shape with this shaper!

Eric Nichols was first licensed as WN6TEE, in 1972. He obtained his KL7 call in 1976, and passed the Extra Class examination in 1977. He is director of engineering at KJNP, a religious broadcasting facility at North Pole, Alaska. He also holds a Radiotelephone First Class ticket and a Radiotelegraph Second Class license. His favorite activities involve homemade gear and experiments with short antennas for 160 meters.

New Products

AMIDON ASSOCIATES RFI-SUPPRESSION FERRITES

☐ Today's RFI problems are much worse than most amateurs experienced even five years ago. The average ham must contend with a host of electronic devices every day, many of which interfere with receivers or become inoperative in RF fields. One example of an RFI-susceptible device is a personal computer. Although capable of providing many useful functions around the shack, a computer placed close to Amateur Radio equipment is likely to require extensive RFI-prevention measures. Otherwise, digital computer noise may mask received signals, and intense RF fields from the transmitter might "crash" the computer system.

To help the amateur/computer hobbyist combat RFI problems, Amidon Associates has introduced a variety of RFI-suppressing ferrite devices. The new components come as "super jumbo" beads, rectangular split cores with a cylindrical center hole, and flat ferrite bars with rectangular center openings. These materials are provided in high-permeability factors of 43, 72 and 77 nomenclature. With μ_i (initial permeability) ratings of 850, 2000 and 2000, respectively, the μ_i for the 72 and 77 materials is the same, but the 77 stock is better suited for work up to 30 MHz. The 72 material is rated to 500 kHz for the upper optimum Q limit.

What can you do with these components? Some application ideas are shown in the accompanying photo. The flat bar halves with the rectangular inner channel are made especially for decoupling flat ribbon cables of the type used with computers. They can be installed without removing end connections, and may be placed close to the equipment case to prevent RF energy from affecting the computer. The presence of the ferrite block will also help to minimize the radiation of spurious energy from the computer. Two types having different center-groove widths (2.04 and 2.57 inches are available).[1]

The very large beads are available in diameters of up to 1 inch, with a maximum length of 1.12 inches and an inner diameter of 0.5 inch. These larger beads can be slipped over coaxial cables such as RG-8 for transmission-line decoupling. Another version (0.526-inch OD, 0.25-inch ID, 1 inch long) may be used with RG-58 and RG-8X cables. They can be used as replacements for coaxial decoupling coils of the type used on many HF-band Yagis. If you already have connectors on the cable and do not wish to remove them to add the ferrite sleeves (beads), you may purchase the Amidon 2X-43 units, place one half of each block on each side of the cable, then tape the halves together.

Large ferrite toroids are also available from Amidon for use in decoupling ac line cords, hi-fi lines, speaker cables, and so on. These toroids are made in diameters of up to 2.4 inches in types 43 and 72 material. A catalog and price list are available from Amidon Associates, 12033 Otsego St., North Hollywood, CA 91607. — *Doug DeMaw, W1FB and Gregory M. Bonaguide, WA1VUG*

[1]mm = in × 25.4.